

Inventors:—RICHARD LAURENCE DUNN and BRIAN ELLISON.



Date of filing Complete Specification : July 5, 1955.

Application Date : July 24, 1954. No. 21664/54.

Complete Specification Published : Aug. 1, 1956.

Index at Acceptance :—Class 108(1), F.

## COMPLETE SPECIFICATION.

### Improvements relating to Stretchers.

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1 Albany Street, London, N.W.1, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to stretchers, that is to say, to appliances upon which patients may be supported in a supine position.

Stretchers are of course in very common use in transporting patients by ambulance, but when a patient supported on a stretcher has to be given attention in an ambulance which is travelling rapidly, serious difficulties are liable to arise on account of the transmission of the jolts or vibrations of the ambulance to the patient's body. The patient may also tend to roll or slide off the stretcher altogether.

It is an object of the present invention to provide a stretcher which shall reduce the transmission of the jolts or vibrations of a vehicle to a patient supported on the stretcher.

According to the invention, a stretcher has a substantially rigid mattress-supporting pan in which the parts corresponding with the heavier parts of the human body are depressed below the level of the other parts, and has a mattress of resilient cellular material whose under-surface has a configuration substantially complementary with the upper surface of the mattress-supporting pan.

The mattress-supporting parts of the present stretchers may suitably be mounted on stretcher frames of substantially the usual kind.

The configuration of the present mattress-supporting pans may suitably be such that the parts corresponding with the trunk of the human body are depressed three to five inches below the level of the sides and ends of the pan. The mattresses, on the other

hand, may have various configurations. Thus, in one case, the mattress is made to vary in depth so that those parts of it which correspond with the heavier parts of the human body have depths materially greater than the other parts. In this case it may be arranged that the top surface of the mattress is substantially plane when the stretcher is not in use. When those parts of the mattress which correspond with the heavier parts of the human body have depths materially greater than the other parts, the portion of the mattress that is to support the trunk may suitably have a depth of four to eight inches, and the depth may suitably decrease, away from this portion, to one to three inches at the sides and ends. Another form of mattress which may be used in the present stretchers is so shaped that even when the stretcher is not in use the upper surface of the mattress has a concavity in those parts of it which correspond with the heavier parts of the human body. A mattress of this kind may be substantially uniform in thickness. The mattress and supporting pan may suitably be about six feet long and about two feet wide.

Examples of resilient cellular materials that the mattress may be formed of are foam rubber and resilient expanded synthetic resin compositions, such as expanded polyvinyl chloride compositions and polyurethane foams; by polyurethane foams are meant resilient cellular materials obtainable by reacting a polyester with an organic di-isocyanate or poly-isocyanate and an activating agent. The mattress may have a protective covering such as a textile fabric, a rubberized textile fabric, or a rubber sheet.

The mattress-supporting pan may conveniently be a sheet metal pressing, but it may also be made of such other materials as a suitable reinforced synthetic resin composition, e.g. a polyester synthetic resin composition having a glass-fibre reinforcement.

[Price 3s. 0d.]

Printed by 46 64

When the mattress has cavities in its lower surface, as in the usual forms of foam rubber upholstery, the pan may be provided with holes so that the passage of air into and out of the cavities is facilitated and the effective softness of the mattress is increased. For cavities of the usual volumes, the holes need not have a diameter greater than about  $\frac{1}{4}$ ".

Two embodiments of the invention are illustrated in the accompanying drawings, in which:—

Figure 1 is a longitudinal vertical section through one form of stretcher constructed in accordance with the invention;

Figure 2 is a transverse vertical section through the same stretcher on the line II—II shown in Figure 1;

Figure 3 is a longitudinal vertical section through another form of stretcher constructed in accordance with the invention; and

Figure 4 is a transverse vertical section through the same stretcher on the line IV—IV shown in Figure 3.

In Figures 1 and 2, the mattress is shown at 11, the mattress-supporting pan at 12, and the carrying frame at 13. The pan is depressed in the region 14 corresponding with the trunk of the human body, but the mattress 11 has its thickness increased in this region so that its upper surface is substantially plane when the stretcher is not in use.

In Figures 3 and 4, the mattress is shown at 21, the mattress-supporting pan at 22, and the carrying frame at 23. As before the pan is depressed in the region corresponding with the trunk of the human body, shown at 24, but in this case the mattress 21 is substantially uniform in thickness and accordingly has a concavity 25 in the trunk region even when the stretcher is not in use.

A marked stabilizing effect is observed when a patient being carried in a rapidly travelling ambulance is supported on a stretcher constructed in accordance with the invention.

What we claim is:—

1. A stretcher having a substantially rigid mattress-supporting pan in which the parts corresponding with the heavier parts of the human body are depressed below the level of the other parts, and having a

mattress of resilient cellular material whose under-surface has a configuration substantially complementary with the upper surface of the mattress-supporting pan.

2. A stretcher according to Claim 1, in which the parts of the mattress-supporting pan corresponding with the trunk of the human body are depressed three to five inches below the level of the sides and ends of the pan.

3. A stretcher according to either of the preceding claims, in which those parts of the mattress which correspond with the heavier parts of the human body have depths materially greater than the other parts.

4. A stretcher according to Claim 3, in which the top surface of the mattress is substantially plane when the stretcher is not in use.

5. A stretcher according to either of Claims 3 and 4, in which the portion of the mattress that is to support the trunk has a depth of four to eight inches, and the depth gradually decreases, away from this portion, to one to three inches at the sides and ends.

6. A stretcher according to either of Claims 1 and 2, in which, even when the stretcher is not in use, the upper surface of the mattress has a concavity in those parts of it which correspond with the heavier parts of the human body.

7. A stretcher according to Claim 6, in which the thickness of the mattress is substantially uniform.

8. A stretcher according to any of the preceding claims, in which the mattress is of foam rubber.

9. A stretcher which is substantially as described above with reference to Figures 1 and 2 of the accompanying drawings.

10. A stretcher which is substantially as described above with reference to Figures 3 and 4 of the accompanying drawings.

11. A mattress adapted to form a component of a stretcher according to any of Claims 3, 4, 5 and 9.

12. A mattress according to Claim 11 which is of foam rubber.

13. A mattress-supporting pan adapted to form a component of a stretcher according to any of Claims 1 to 10.

G. W. I. SHEAVYN,  
Agent for the Applicant.

## PROVISIONAL SPECIFICATION.

### Improvements relating to Stretchers.

We, DUNLOP RUBBER COMPANY LIMITED, a British Company, of 1 Albany Street, London, N.W.1, do hereby declare this invention to be described in the following statement:—

This invention relates to stretchers such as are used in transporting patients by ambulance.

When a patient has to be given attention, e.g. has to be given a blood transfusion, in

an ambulance which is travelling rapidly, serious difficulties are liable to arise on account of the transmission of the jolts or vibrations of the ambulance to the patient's  
5 body. The patient may also tend to roll or slide off the stretcher altogether.

It is an object of the present invention to provide a stretcher which shall reduce the transmission of the jolts or vibrations of a  
10 vehicle to a patient supported on the stretcher.

According to the invention, a stretcher has a mattress of resilient cellular material in which the parts corresponding with the  
15 heavier parts of the body have depths materially greater than the other parts, and has a substantially rigid mattress-supporting pan in which the parts corresponding with the heavier parts of the body are depressed, the  
20 mattress-supporting pan being mounted on a stretcher frame of substantially the usual kind. The arrangement is normally such that the top surface of the mattress is substantially plane when the stretcher is not in use.

25 The invention also includes stretcher mattresses, as specified above, and stretcher mattress-supporting pans, as specified above.

Examples of resilient cellular materials that the mattress may be formed of are foam  
30 rubber and resilient expanded synthetic resins. The mattress may have protective covering such as a textile fabric, a rubber-

ized textile fabric, or a rubber sheet.

In a construction typical of the invention, the portion of the mattress that is to support  
35 the trunk has a depth of about six inches, and the depth gradually decreases, away from this portion, to about two inches at the sides and ends. A supporting pan for use with this mattress has a complementary  
40 depression so that when not loaded the top surface of the mattress is substantially plane. The mattress and pan may suitably be six feet long and about two feet wide.

The pan may conveniently be a sheet metal pressing, but it may also of course be made  
45 of such other materials as a suitable reinforced synthetic resin. When the mattress has cavities in its lower surface, as in the usual forms of foam rubber upholstery, the  
50 pan may be provided with holes so that the passage of air into and out of the cavities is facilitated and the effective softness of the mattress is increased. For cavities of the  
55 usual volumes, the holes need not have a diameter greater than about  $\frac{1}{4}$ ".

A marked stabilizing effect is observed  
when a patient being carried in a rapidly travelling ambulance is supported on a  
60 stretcher constructed in accordance with the invention.

G. W. I. SHEAVYN.  
Agent for the Applicant.

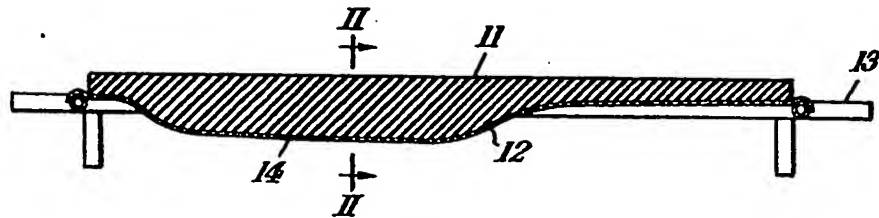


Fig. 1.

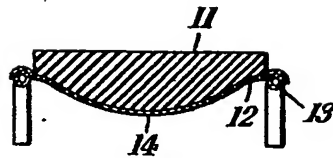


Fig. 2.

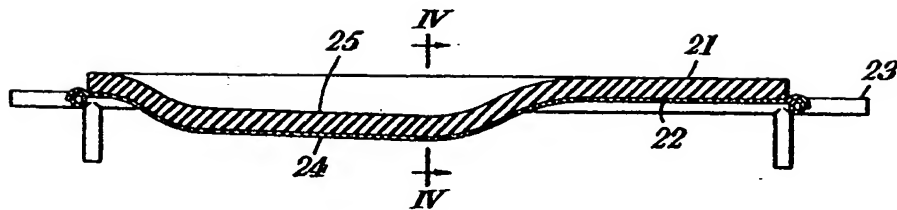


Fig. 3.

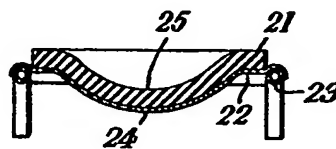


Fig. 4.